**Before the**
**FEDERAL COMMUNICATIONS COMMISSION**
**Washington, DC**

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| **In the Matter of** | ) | |
| | ) | |
| **Broadband Industry Practices** | ) | **WC Docket No. 07-52** |
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# COMMENTS OF THE FIBER-TO-THE-HOME COUNCIL ON THE PETITION FOR DECLARATORY RULING REGARDING INTERNET MANAGEMENT POLICIES AND ON THE PETITION FOR RULEMAKING TO ESTABLISH RULES GOVERNING NETWORK MANAGEMENT PRACTICES BY BROADBAND NETWORK PROVIDERS

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## SUMMARY

The Free Press *et al.* Petition and the Vuze Petition ("*Network Management Practices Petitions* ") present issues similar to those raised by the Commission in its *Wireline Broadband Practices* Notice of Inquiry and addressed in comments filed in that proceeding by many interested parties, including the Fiber-to-the-Home ("FTTH") Council. Once again, the critical issues are: whether there is a demonstrable showing of anticompetitive harm by wireline broadband providers engaging in exclusionary practices to the detriment of consumers and content and applications providers; and whether the regulatory solution proposed by the petitioners produces real benefits without concomitant harm. After careful examination of the facts, analysis, and regulatory proposals in the petitions, the FTTH Council believes the petitioners have not met either requirement in regard to the allegedly harmful network management practices.

There is no reason for the Commission to clarify or amend its *Broadband Policy Statement*, which permits reasonable network management practices, or to adopt rules elaborating on permissible network management practices. The simple fact is that network management practices are so necessary (even in FTTH networks with tremendous capacity), vary so greatly among network providers, are so driven by architecture, usage, and other factors, and are highly sensitive because of security concerns. Consequently, absent a compelling demonstration that anticompetitive harm exists and that precise rules can be adopted, the Commission should not act. This is especially the case because vague rules will freeze the ability of providers to properly manage and upgrade their networks, producing great harm. In addition, there are all indications that network providers and content and applications providers can work cooperatively, and are doing so, to fashion solutions. In such an environment, the

Commission's role should be to encourage industry-driven solutions and to deal with issues involving alleged improper actions through complaints, which are well-suited to address specific providers and practices and where a complete factual record can be developed.

Finally, the Council believes that network providers have an obligation to notify users in clear and easily understood language of the terms and conditions of the services they purchase. That, however, does not mean that there also is an obligation to disclose the precise nature, including technologies employed, of the providers' network management practices. Not only do these practices change constantly, but network providers must be able to control their disclosure to ensure that network security and reliability is achieved and maintained.

Accordingly, the Commission should deny the declaratory relief sought by Free Press *et al.* At the same time, the Commission should decline to initiate a rulemaking as requested by Vuze.

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The Fiber-to-the-Home Council ("FTTH Council" or "Council"), through its undersigned counsel, hereby respectfully submits its comments to the Federal Communications Commission ("Commission") in response to the Petition for Declaratory Ruling regarding Internet management policies filed by Free Press *et al.*[1] and to the Petition for Rulemaking to establish rules governing network management practices by broadband network providers filed by Vuze, Inc.[2] issued in the above-captioned proceeding.[3] As discussed herein, the petitioners

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[1] Petition for Declaratory Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does Not Meet an Exception for "Reasonable Network Management" filed by Free Press et al, Nov. 1, 2007. ("*Free Press Petition*")

[2] Petition for Rulemaking to Establish Rules Governing Network Management Practices by Broadband Network Operators filed by Vuze, Inc. Nov. 14, 2007. ("*Vuze Petition*")

[3] *In the Matter of Broadband Industry Practices*, WC Docket No. 07-52, Petition for Declaratory Ruling to Establish Rules Regarding Internet Management Policies, DA 08-91 (rel. Jan. 14, 2008) and Petition for Rulemaking to Establish Rules Governing Network Management

. . .*Continued*

have failed to provide evidence justifying the requested relief. Commission regulation is not only unwarranted but would impose costs that far outweigh any potential benefits.

The FTTH Council is a non-profit organization established in 2001 with over 150 members. Its mission is to educate the public and government officials about fiber-to-the-home ("FTTH") and to promote and accelerate FTTH deployment and the resulting quality of life enhancements that FTTH networks make possible. The FTTH Council's members represent all areas of the broadband access industry, including telecommunications, computing, networking, system integration, engineering, and content-provider companies, as well as traditional service providers, utilities, and municipalities. As such, they are very familiar with the architecture, construction, and operation of communications networks.[4]

## I. INTRODUCTION

In June, 2007, the FTTH Council submitted extensive, detailed comments in the Commission's *Notice of Inquiry* in this same docket.[5] These comments were based on the technical expertise of the members of the Council and were further supported by declarations from two applications providers – Cameron Clarke, President and CEO of Vodium, and William R. Hornbeck, Prsident and CEO of StreamerNet Corporation – and two network providers -- Michael, Vice President, Information Technology, Jackson Energy Authority, and George

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Practices by Broadband Network Providers, DA 08-92, (rel. Jan. 14, 2008) (jointly "*Network Management Practices Petitions*").

[4] A more complete description of the FTTH Council, its activities, and its members can be found on the organization's website, http://www.ftthcouncil.org.

[5] *In the Matter of Broadband Industry Practices*, Notice of Inquiry, WC Docket No. 07-52, FCC 07-31 (rel. April 16, 2007) ("*Broadband Industry Practices NOI*"). The FTTH Council's comments can be accessed at: http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519529309.

O'Neal, Vice President of Netowrk Services for GVTC Communications. From these bases, the FTTH Council submitted to the Commission that:

> 1. There is no evidence that network platform providers are engaging in anticompetitive behavior, or harming either end-users or content and applications providers.
>
> 2. The potential for harm is greatly reduced because the market for end-user access to content and applications providers via the Internet is dynamic, with new technologies constantly being developed and implemented, old ones being improved, and new services introduced to maintain a "balance of power" in the market.
>
> 3. End-users and content and applications providers – as well as government officials – are highly vigilant about potential anticompetitive practices by network platform providers, further reducing the possibility of any harm occurring.
>
> 4. The adoption and enforcement of non-discrimination requirements on access tiering by network platform providers will inhibit investment by creating greater uncertainty and by reducing their ability to provide innovative services and to engage in reasonable bandwidth management practices which alleviate congestion and ensure the provision of high-quality service.
>
> 5. The Commission should focus on removing barriers to entry and encouraging entry by providers of local network platform voice, data, and video services, particularly FTTH, and other next generation broadband providers capable of transmitting at very high data rates.

The evidence used by the FTTH Council in the *Wireline Broadband Practices NOI,* the analysis it conducted, and the conclusions it reached are highly relevant to the Commission's consideration of the *Network Management Practices Petitions*. Once again, the critical issues are: whether there is a demonstrable showing of anticompetitive harm by wireline broadband providers engaging in exclusionary practices to the detriment of consumers and content and applications providers; and whether the regulatory solution proposed by the petitioners produces real benefits without concomitant harm. After careful examination of the facts, analysis, and regulatory proposals in the petitions, the FTTH Council believes the petitioners have not met either requirement in regard to the allegedly harmful network management practices.

There is no reason for the Commission to clarify or amend its *Broadband Policy Statement*,[6] which permits reasonable network management practices, or to adopt rules elaborating on permissible network management practices. The simple fact is that network management practices are so necessary (even in FTTH networks with tremendous capacity), vary so greatly among network providers, are so driven by architecture, usage, and other factors, and are highly sensitive because of security concerns. Consequently, absent a compelling demonstration that anticompetitive harm exists and that precise rules can be adopted, the Commission should not act. This is especially the case because vague rules will freeze the ability of providers to properly manage and upgrade their networks, producing great harm. In addition, there are all indications that network providers and content and applications providers can work cooperatively, and are doing so, to fashion solutions. In such an environment, the Commission's role should be to encourage industry-driven solutions and to deal with issues involving alleged improper actions through complaints, which are well-suited to address specific providers and practices and where a complete factual record can be developed.

Finally, the Council believes that network providers have an obligation to notify users in clear and easily understood language of the terms and conditions of the services they purchase. That, however, does not mean that there also is an obligation to disclose the precise nature,

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[6] *In the Matters of Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, CC Docket No. 02-33; *Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services*, CC Docket No. 01-337; *Computer III Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services; 1998 Biennial Regulatory Review – Review of Computer III and ONA Safeguards and Requirements*, CC Docket Nos. 95-20, 98-10; *Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities*, GN Docket No. 00-185; *Internet Over Cable Declaratory Ruling, Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities*, CS Docket No. 02-52; Policy Statement, Rel. Sept. 23, 2005 ("*Broadband Policy Statement*").

including technologies employed, of the providers' network management practices. Not only do these practices change constantly, but network providers must be able to control their disclosure to ensure that network security and reliability is achieved and maintained.

Accordingly, the Commission should deny the declaratory relief sought by Free Press *et al.* At the same time, the Commission should decline to initiate a rulemaking as requested by Vuze.

## II. INTERNET TRAFFIC, CONGESTION, AND NETWORK MANAGEMENT – A BRIEF OVERVIEW

### A. The Internet Today: An Evolving, Best Efforts Network

#### 1. The Internet's Strength: An Open Architecture Driving Growth

The Internet has been characterized as a network-of-networks[7] that interconnect and are joined by a common protocol (TCP/IP) enabling the delivery of packets of data across the metanetwork.[8] At its most basic, the Internet operates on the end-to-end principle, whereby routers in the network pass packets without much processing to edge computers.[9] This, in effect, places intelligence at the edge of the network, where vast amounts of memory and processing

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[7] These networks include the many networks of Internet Service Providers ("ISPs"), which connect end-users to the Internet "Cloud," and Backbone Providers, which connect ISPs and provide access to content and applications. These networks enter into private agreements between themselves to interconnect and exchange traffic – generally not subject to government oversight. The larger (Tier 1) backbone providers exchange traffic through a peering arrangement where no payments are made between providers. This practice is premised on the likelihood that each provider is sending and receiving a roughly equal amount of traffic. In contrast, non-Tier 1 providers lack the same substantial and equivalent traffic flows and must pay the Tier 1 providers for transport (transit agreements).

[8] *Only Connect* (draft February, 2007), Kevin Werbach, at 16. ("*Werbach Article*") (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=964991)

[9] *Nuts and Bolts of Network Neutrality* (Version of July 6, 2006), Edward W. Felten, at 2. ("*Felten Paper*") http://itpolicy.princeton.edu/pub/neutrality.pdf

power are available and where end-user demands can be most directly entertained. This edge network architecture has been one of the reasons Internet-driven applications and services have been so innovative and dynamic.[10] As will be discussed below, this same architecture, because of its openness and flexibility, also provides the tools by which applications providers are able to move intelligence from the edge to other locations in the Internet.

2. The Internet is a "Best Efforts" Network

The Internet transmits packets in no particular order, on no fixed path, and on a *"best efforts"* principle with no assurance they will reach their destination.[11] Dropped packets may occur, for instance, due to network congestion, when routers run out of buffer memory. When edge computers assemble these packets coming from different routers into the original message, they are able to recognize packets are missing and ask for them to be resent.[12]

As a result of these characteristics, and the fact that different applications place different demands on the packet networks, the Internet is "friendlier" to certain applications. Viewing a static web page or one with a small amount of animation imposes minimal traffic requirements. Actively downloading or uploading a file causes a burst in traffic. If there are a sufficient number of users engaging in the same activity at once, it can lead to congestion and

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[10] A very rough idea of the number of businesses that use the web can be gained from the fact that there are almost 1.4 billion domains registered in the United States and over 118 million active users visiting several sites each day. (*See* http://www.domaintools.com/internet-statistics/country-ip-counts.php and http://www.nielsen-netratings.com/press.jsp?section=pr_netv&nav=3.) In a relatively brief time, businesses have used the flexible and dynamic nature of the Internet to develop a wide-range of business models, including "merchant" (on-line retailing), "manufacturer" (direct sales to end-users), and "brokerage" (auctions). (*See Business Models on the Web*, Managing the Digital Enterprise, Michael Rappa, May 16, 2007. http://digitalenterprise.org/models/models.html.)

[11] *Id.* at n.2. *Werbach Article* at 16.

[12] *Felten Paper* at 2,3.

delay. At its most harmful, congestion can halt the transmission of traffic on key links or large parts of the network. This could occur because of a denial of service attack. It also might be driven by certain types of technologies or applications. For instance, as discussed later, versions of P2P technologies, which often transmitted large file sizes, can consume substantial amounts of bandwidth on many links and pose a real problem for platform providers. There also are applications that are not "TCP-friendly, which means when congestion occurs...these applications do not reduce their rate of transmission to allow the congestion to subside."[13] Even some lesser instances of congestion can lead to jitter (on and off triggering). Jitter has little effect on most browsing activities, but it can noticeably affect applications that require steady, interactive, real-time transmission, such as on-line gaming and VoIP.[14]

There are other serious issues that arise in the transmission of Internet traffic. Malware attacks are frequent. While most of these are annoying, some can be devastating. Just-in-time applications, such as emergency services or VoIP transmissions, often suffer because of traffic overloads or equipment failures. There are also grave concerns because the network does not guarantee secure transmissions.

3. The Internet Evolves Continuously to Address New Requirements and Concerns, Giving Users New Tools and Challenging Network Providers

While efforts have been underway for years to reexamine the entire structure of the Internet, fundamental changes in the delivery of packets are occurring continuously to deal with new requirements and concerns, building on rather than discarding the basic architecture of the Internet. These changes, which may be in the form of additional facilities, software, or both,

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13 *The Benefits and Risks of Mandating Network Neutrality, and the Quest for a Balanced Policy*, Jon M. Peha, 34th Telecommunications Policy Research Conference, Sept. 2006 at 7. ("*The Benefits and Risks of Mandating Network Neutrality*")

14 *Id.* at 4.

are introduced by individuals or entities that take as a given the basic characteristics of the Internet and then impose specific "overlay" solutions that provide new functionalities and services.[15] Often, the intelligence in these overlay solutions is not at the traditional edge of the Internet but rather deeper in the networks – between functionalities provided by ISPs and the applications riding over the transmission paths. These solutions thus "blur the clean internet architecture distinction between packet forwarding and application processing"[16] and may alter the basic operating environment of the Internet. At the same time, such overlays have become "the mechanism of choice for introducing functionality into the internet."[17]

It may be somewhat surprising but some of the earliest overlay solutions were mail and web servers, which provided applications as network "infrastructure" and were operated by third parties. Today, the number and variety of these overlay networks are substantial and constantly evolving, addressing such concerns as ensuring delivery of packets and enhancing security.[18] It is clear that innovation through the creation of overlay networks is bound to continue in response to end-user demands for new functionalities – or possibly to give end-users and upstream providers "a range of technical and market-based strategies for

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15 *See Overlay Networks and the Future of the Internet*, Dave Clark et al., Communications & Strategies, No. 63, 3rd Quarter 2006, at 4, defining an overlay as "a set of servers deployed across the internet that: a) Provide infrastructure to one or more applications, b) Take responsibility for the forwarding and handling of application data in ways that are different from or in competition with what is part of the basic internet, c) Can be operated in an organized and coherent way by third parties (which may include collections of end-users)". ("*Overlay Networks Article*")

16 *Overlay Networks Article* at 7.

17 *Id.*

18 *See, Id.* at 3.

responding to discrimination."[19] In a very real sense, the Internet's common and open environment is spawning heterogeneous and specialized services and features tailored to the needs of users. If these capabilities become widely used – as in the case of email and web servers – they may essentially become part of the basic Internet infrastructure, with the potential for new overlays built on top of them. In the meantime, they lead to greater differentiation among both applications and Internet users. As noted by Kevin Werbach,

> "Today's Internet already countenances discrimination...Providers of content and applications that desire enhanced delivery have several options: they can buy a bigger pipe or a stricter service level agreement (SLA) from their backbone operator; they can go to a private exchange point or CDN that overlays intelligence on the Internet infrastructure; or they can self-provision distributed capacity, as companies such as Google and Microsoft do today."[20]

It is difficult to understate the crucial importance of overlay networks and their effect on the overall ecosystem of the Internet. For end-users, overlay networks have the advantage of giving them a new array of tools, even while possibly lessening their control. For network providers, the overlay networks create new and potentially unpredictable amounts and flows of traffic – some of which may complement existing network capabilities and others of which can overwhelm them – harming the user's experience.

### B. Network Congestion is a Fact of Life, and Traffic Management is Essential to Ensure a Satisfactory Experience for End Users

#### 1. Overview of Network Management

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19 *See Scenarios for the Network Neutrality Arms Race,* W. Lehr et al., Presented at the 34th Research Conference on Communication, Information, and Internet Policy, Aug. 31, 2006, at 2. ("*Scenarios for the Network Neutrality Arms Race*")

20 *Werbach Article* at 34.

Network management practices deal with traffic loads and constitute a "complicated"[21] and well-accepted undertaking.[22] If the traffic load increases beyond engineered volume levels, congestions occurs at switching points or shared transmission facilities. All end-users both downstream and upstream from the point of congestion will potentially be affected. The degree to which end-users feel the impact of congestion depends, in significant part, on the applications they are running. Do they exhibit bursting activity (*e.g.* basic browsing), or are there more continuous packet demands (*e.g.* video or voice applications)? To prevent the deterioration of service, network managers traditionally have engaged in many practices including re-routing or prioritizing traffic (especially for public safety uses). Network providers also offer quality-of-service ("QoS") guarantees to both end-users and other providers as part of select service offerings, which provide greater assurance of delivery (as opposed to "best efforts). QoS can be provided by dedicating network capacity or through other methods of differentiation.

With the explosion of Internet access and other data traffic, network management has taken on even greater importance and become even more challenging for a variety of reasons. First, service is usually priced on a flat-rate basis for unlimited usage, and subscribers have become accustomed to accessing the Internet on this basis. This has facilitated the

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21 *Felten Article* at 5.

22 "Most ISPs...plan their facilities with the idea that no more than 15 percent of customers are active at any time. If some number significantly above 15 percent attempted to be active, service would suffer. Through the magic of TCP/IP, suffering in this case means service would slow to a crawl, not end outright....These 10-15 percent numbers appear again and again in network planning, but remember that in the case of ISPs, just because a maximum of 15 percent of users are online doesn't mean that they are all sending the same number of bits at the same exact moment. ISPs actually expect bit utilization to mirror user activity so only 10-15 percent of that 10-15 percent is actually sending bits at any given second, which is how ISPs size their actual Internet connection." (*See, The Skpye is Falling*, Robert X. Cringely, July 13, 2006 at http://www.pbs.org/cringely/2006/pulpit_20060713_000347.html.)

enormous growth of applications using peer-to-peer ("P2P") technologies, where content is hosted on numerous edge devices, each of which is able to transmit content to an end-user. As discussed below, P2P traffic is the predominant, if not dominant, generator of Internet traffic. Second, P2P technologies also tend to transmit traffic more symmetrically, in contrast to users who largely download information. Third, customers are subscribing to higher-bandwidth services. This has spawned on-line gaming and video streaming applications. Fourth, subscribers are using applications such as VoIP which require low-latency. Fifth, malware in all its forms is growing – from spam to denial of service attacks to viruses, worms, spyware, and phishing.

Network providers need to deal with all of these problems to ensure the customer has a satisfactory experience. They use a combination of traditional industry practices and new solutions. To handle issues of security, providers can employ Deep Packet Inspection ("DPI") technologies.[23] DPI enables the provider to examine all bits in the packet payload to ensure it does not contain anything that would compromise the network. DPI also may be used to deal with congestion,[24] but there are other technologies or solutions that can handle this problem as well, including bandwidth segmentation and prioritization among classes of users. The network provider also can alleviate some types of congestion by increasing network capacity, and FTTH networks, with their huge capacities, are becoming critical for many providers. However,

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[23] *See, e.g., Modern Network Security: The Migration to Deep Packet Inspection, White Paper*, eSoft, 2005 at 5. http://www.esoft.com/pdf/White%20Paper%20-%20Migration%20to%20DPI.pdf

[24] *See, e.g., Optimizing Application Traffic with Cisco Service Control Technology* at http://www.cisco.com/application/pdf/en/us/guest/products/ps6150/c1031/cdccont_0900aecd80241955.pdf.

building more capacity may not be cost-effective, especially in comparison to the use of traffic management techniques.

Cable networks present their own network management challenges. Cable providers operate a "ring" network where each subscriber shares a transmission facility and is allocated bandwidth on that facility. Internet access service is provided pursuant to the CableLabs' standardized architecture: Data over Cable Service Interface Specifications ("DOCSIS").[25] The DOCSIS architecture enables the subscriber's cable modem to forward and receive IP over Ethernet packets through the network to the Cable Modem Termination System (a router or bridge) and on to an ISP.

To enable data transmission, cable operators allocate bandwidth on the network. Most often, a 6 MHz channel (a single channel for the transmission of a television signal) can accommodate a few hundred users with data rates of up to 40 Mbps downstream. Currently deployed networks can accommodate up to 30 Mbps upstream on a 6.4 MHz channel. In the next generation of DOCSIS, these data rates are expected to increase significantly.[26]

Because overall network capacity is limited and edge bandwidth is not dedicated to each user but rather is shared among users, cable networks have unique challenges in allocating bandwidth to deal with congestion and ensure a satisfactory customer experience. Cable operators are able to address congestion generally by: (1) deploying QoS and intelligent bandwidth management techniques; (2) assigning more bandwidth; and (3) placing additional

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[25] CableLabs DOCSIS Project Primer, 2006, at http://www.cablemodem.com/primer/. ("*DOCSIS Project Primer*"). Since 1995, there have been four versions of DOCSIS. DOCSIS 1.0 established the basis interface parameters for data transmission. DOCSIS 1.1 added security and QoS features. DOCSIS 2.0 enabled greater upstream throughput. DOCSIS 3.0, which was recently finalized, permits channel bonding for higher speed transmissions (at a minimum 160 Mbps downstream and 120 Mbps upstream) and support for IPv6.

[26] *Id.*

Web cache servers at proper locations within the network.[27] Cisco, for instance, offers a product for cable operators, Dynamic Flow Control – which is designed to facilitate on-line gaming by allocating bandwidth in real-time through the use of PacketCable™ Multimedia Technology and DPI.[28] Cable operators are certain to continue to use and upgrade these bandwidth management techniques to deal with increasing demand. This is particularly the case because the alternative – undertaking a major upgrade of the entire network infrastructure – is enormously expensive.

2. Peer-to-Peer Networks May Pose Real Challenges for Network Management

Initial P2P networks[29] had a central server acting as a control for the software installed and content stored on a great many edge computers, each of which could supply the requested information. This technology has since evolved so that no central control server is required and often the edge computers only needed to supply a fragment of the total file. Thus, each edge computer becomes a server storing content and containing the necessary software and control capabilities to enable the overall network of similar servers to supply content when

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[27] See, *IP Meets Voice, Video and Data*, D.R. Evans et al., Communications Technology, Feb. 1, 2003. http://www.cable360.net/ct/strategy/emergingtech/14881.html

[28] *Cisco Dynamic Flow Control for On-line Gaming* at http://www.cisco.com/application/pdf/en/us/guest/netsol/ns457/c654/cdccont_0900aecd8055d29c.pdf.

[29] It is important to note that P2P network traffic patterns vary considerably based on the type of traffic shared. The discussion in this section focuses primarily on networks where large (particularly video) files are shared, which also is the focus of the *Free Press Petition* and *Vuze Petition*. Other P2P networks, such as Skype, transmit VoIP traffic. The files transferred in VoIP calls "are smaller than in file-sharing networks." (*An Experimental Study of the Skype Peer-to-Peer VoIP Ssytem*, S. Guha and N. Daswani/R. Jain at http://iptps06.cs.ucsb.edu/papers/Guha-skype06.pdf.) It also is worth noting that in the case of Skype, "a lot of Skype connections aren't P2P at all." These other connections require server assistance from Super Nodes because access for one user is hidden behind a firewall. (*See, The Skpye is Falling.*)

demanded by an end-user. Today, millions of computers around the world are part of P2P networks, and these networks are the largest distributors of large-sized (video) files.[30]

Moreover, P2P technology is a highly attractive transmission methodology. With an even more distributed architecture, P2P networks have the potential to be even more efficient and economical than Content Distribution Networks, such as Akamai or Limelight, for the transmission of large files. According to the Vice President of Engineering for MediaZone, "With 250 users, we use 85% less bandwidth, meaning we save 85% of the cost. With 25,000, we save 99%."[31] It is therefore not surprising that last year Akamai acquired a P2P entity, Red Swoosh.[32]

Yet, even with these benefits, P2P networks may raise substantial concerns about congestion. First, many P2P networks simply transmit vast amounts of data from millions of end users throughout the day. This traffic frequently bursts when new content first becomes available. There are a variety of estimates of the amount of P2P traffic – all of which point to the fact that P2P file transmissions are either the dominant or predominant generator of all Internet traffic. CacheLogic, for instance, finds that P2P traffic makes up between about 60% to 80% of total Internet traffic.[33] A recent news article reports that industry sources estimate that P2P traffic comprises between 37%-95% of total traffic at any given moment.[34] A study of P2P

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30 *Building the Infinite Internet,* Scott Woolley, Forbes Magazine. April 23, 2007, at 77.

31 *Id.*

32 *See* Akamai Acquires Red Swoosh (April 12, 2007), www.akamai.com/html/about/press/releases/2007/press_041207.html.

33 *See, P2P Fuels Global Broadband Binge*, Wired Magazine, April 14, 2005 at http://www.wired.com/techbiz/media/news/2005/04/67202.

34 *BitTorrent, Comcast, EFF Antipathetic to FCC Regulation of P2P Traffic*, D.Downs, *SF Weekly*, Jan. 23, 2008 at http://www.sfweekly.com/2008-01-23/news/bittorrent-comcast-eff-antipathetic-to-fcc-regulation-of-p2p-traffic/.

traffic usage at just the University of Southern California found the amount is 21%-33% of total flow, but at the University of Calgary, the amount is between 30%-70%.[35]

Second, P2P networks rely on the transmission of data symmetrically from end-users, which poses particular traffic management issues for network platform providers that offer asymmetric Internet access services. In initial P2P technology generations, a large part of this congestion problem was due to technology that uploaded an entire, often massive, file from a single edge computer. In more recent generations, P2P providers, distribute the uploads by taking fragments of the entire file from many different edge computers in many different locations – making it difficult for any single network provider to control usage. Yet, even in these newer versions, congestion concerns remain.

For instance, in a recent study James Martin and James Westall from the Department of Computer Science at Clemson University assessed the impact of BitTorrent's P2P technology on cable networks and found that "as few as 15 BitTorrent users can significantly reduce the service quality experienced by other subscribers."[36] More specifically, this type of congestion caused web response times to decrease "in performance by a factor of 2.5"[37] and the VoIP calls to experience significantly increased latency and jitter.[38] One reason for these problems is that BitTorrent uses a unique protocol that causes a user that downloads a file to

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35 *Estimating P2P Traffic Volume at USC*, G. Bartlett, J. Heidemann, C. Papdopoulous, and J. Pepin, June, 2007 at http://www.isi.edu/~johnh/PAPERS/Bartlett07c.pdf.

36 *Assessing the Impact of BitTorrent on DOCSIS Networks*, James J. Martin and James M. Westall, Department of Computer Science, Clemson University at http://people.clemson.edu/~jmarty/papers/bittorrentBroadnets.pdf.

37 *Id.* at 7.

38 *Id.* at 8.

consume more "upstream bandwidth than downstream in the process."[39] Finally, as a demonstration that network management practices are different for each network, the authors concluded that these problems are not as great in the xDSL network because they utilize "intelligent queuing algorithms in gateway routers."[40]

Concerns about network congestion also were recently expressed by the founder of a new P2P company, Rinera, when he stated that "The network itself needs to be informed about the types of traffic it's handling, and service providers need to participate by setting policies. Otherwise, as applications like video downloading take off, we will see a congested network, which will in turn impede the development of video-sharing technology."[41] To address these concerns, Rinera is adding traffic management control for network providers to its P2P technology to further enable the transmission of large files without congestion.[42] The next section will delve further into other industry efforts to bridge the gap between network providers and P2P providers so that congestion is minimized and the experience for all end users is enhanced.

It is because of the congestion problems created by certain P2P technologies that network providers may engage in managing such traffic and that equipment vendors have developed "traffic shaping" devices, which by various means impose "additional delay" on a set

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39 *Id.* at 1.

40 *Id.*

41 *See P2P: From Internet Scourge to Savior,* Wade Roush, Technology Review, (Dec. 15, 2006). http://www.technologyreview.com/oprinter_friendly?article.aspx?id+17904

42 *Id.*

of packets "such that they conform to some predetermined constraint." These devices are "widely used" by network providers "to optimize the use of their network."[43]

Cisco, for example, offers a product, Service Control, that identifies P2P traffic and then enforces network traffic policies through such mechanisms as deprioritizing P2P, throttling uploads but not downloads, and enforcing a quota.[44] Another vendor, Sandvine, which has installed its equipment with network providers around the world, sells its Intelligent Traffic Management solution, which has "accurate Layer 7 identification to apply application-specific QoS policies."[45]

At the same time as network providers install these traffic management devices, P2P technologies morph and users develop new countermeasures to foil them. Use of VPNs and encryption techniques are common types of countermeasures – which may in turn produce further reaction from network providers. Fortunately, as will be discussed below, more cooperative industry-led efforts are underway.

3. Efforts by P2P Providers, Network Providers, and Equipment Vendors to Ensure an Improved End-User Experience

Many players in the industry understand that cooperation may be a winning strategy for both sides. To that end, efforts are underway to bring P2P entities, network providers, and equipment vendors together to enhance the user experience. One such effort is

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43 *See*, Wikipedia article on Traffic Shaping. http://en.wikipedia.org/wiki/traffic_shaping

44 *See*, Optimizing Application Traffic with Cisco Service Control Technology at http://www.cisco.com/en/US/prod/collateral/ps7045/ps6129/ps6133/ps6150/prod_brochure0900aecd80241955_ps6151_Products_Brochure.html.

45 *See,* Sandvine Intelligent Traffic Management at http://www.sandvine.com/solutions/p2p_policy_mngmt.asp.

led by the Distributed Computing Industry Association, which represents many P2P entities among others. It has established the P4P Working Group, which seeks:

> To work jointly and cooperatively with leading Internet service providers (ISPs), peer-to-peer (P2P) software distributors, and technology researchers to ascertain appropriate voluntary best practices for the use of "P4P" mechanisms to accelerate distribution of content and optimize utilization of ISP network resources in order to provide the best possible performance for end-user customers.[46]

The group is led by individuals from Pando Networks and Verizon and includes in its Core Group representatives from AT&T, BitTorrent, Cisco Systems, Joost, VeriSign, and Washington and Yale Universities.[47] Many cable companies, content providers, and equipment vendors are Observers. This effort starts from the premise that traditional network management practices, including alternative routing and packet dropping, are ineffective in dealing with P2P created congestion because of the "highly dynamic, scattered traffic pattern caused by dynamic, unguided (network-oblivious) peer selection" and that the industry needs to develop a "mechanism for ISPs to communicate with P2P about network structure and policies."[48] So far simulations of the P4P technology have yielded "a dramatic drop in data delivery average 'hop

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[46] See, DCIA P4P Working Group Mission Statement at http://www.dcia.info/documents/P4PWG_Mission_Statement.pdf. The P4P concept was originally developed by researchers at Yale University and Washington University. *See, P4P: Explicit Communications for Cooperative Control Between P2P Networks and Network Providers*, H. Xie, A. Krishnamurthy, A. Silberschatz, and Y. R. Yang at http://64.233.169.104/search?q=cache:X7r7DpJv1UIJ:www.cs.yale.edu/homes/yong/ccount/click.php?id=2+P4P+yong+yale&hl=en&ct=clnk&cd=2&gl=us.

[47] *See, P4P: ISPs and P2P*, a presentation by Laird Popkin, Pando Networks, and Doug Pasko, Verizon, at the DCIA P2P Media Summit, January, 2008, at 4 (accessed at http://www.dcia.info/activities/p4pwg/1-8%20P4P%20--%20ISPs%20&%20P2P.ppt).

[48] *Id.* at 2.

count', which equates to lower costs for ISPs" and "a dramatic improvement in data delivery speed, which results in faster downloads for users."[49]

In addition to the original P4P technology, individual equipment vendors are producing alternative solutions, which also were presented to the P4P Working Group. CacheLogic has developed, Velocix, a hybrid P2P network technology, which delivers video "from a dynamic selection of multiple servers."[50] Another vendor, oversi, has developed a caching technique that accelerates P2P performance and optimizes network performance,[51] and Peerapp has launched another caching technology.[52]

From the standpoint of the Commission's consideration of the *Free Press Petition* and *Vuze Petition*, which implicitly are premised upon a veritable state of war among network providers and content and applications providers, it is important to note that once-inimical industry sectors are cooperating with a common goal: the benefit of consumers. Martin Lafferty, President of DCIA, has stated, "Our view is that this type of collaboration on the private sector side on technology solutions and business practices for working together has a much better chance of producing better services for consumers than a government flat-rate edict."[53] It also is important for the Commission to understand that the network management

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49 *Id.* at 13, 14.

50 *CacheLogic™ Revolutionizing Digital Asset Delivery*, P4P Working Group, Christy Thomas, Vice President Business Development, January 8, 2008. http://www.dcia.info/activities/p4pwg/1-8%20CacheLogic%20P4P.pdf

51 *P4P Meeting*, Eitan Efron Vice President Business Development, oversi, January, 2008. http://www.dcia.info/activities/p4pwg/1-8%20Oversi%20P4P.ppt

52 *P2P Application Management for Service Providers*, P4P Working Group, Alan Arolovitch, PeerApp, January, 2008. http://www.dcia.info/activities/p4pwg/1-8%20PeerApp%20P4P.ppt

53 *Telco, Cable Interests Join new Group in Pursuit of More Efficiencies in P2P*, ScreenPlays, Aug. 2007 at

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policies being considered are complex and constantly evolving. In the face of such circumstances, the Commission should only step-in if it has clear proof of a material problem that is not being solved by market participants and is confident that regulatory solutions will have benefits that significantly outweigh any costs. [54]

## III. THERE IS INSUFFICIENT EVIDENCE OF EXCLUSIONARY PRACTICES BY NETWORK PLATFORM PROVIDERS RELATED TO NETWORK MANAGEMENT ACTIVITIES

The petitioners contend that network providers are engaging in improper acts in violation of the *Wireline Broadband Policy* and that therefore the Commission should clarify its policy or adopt new rules regarding network management practices. They provide as a basis for these allegations that "Comcast has been degrading and blocking peer-to-peer applications"[55] and "Comcast has taken steps designed to impede large file traffic by actively interfering with its subscribers' ability to upload and share files."[56] The petitioners makes no material allegations that other network providers are engaging in improper network management practices.

It is on the basis of the alleged harms caused by Comcast that Free Press *et al* seek to have the Commission declare for all network providers that "intentionally degrading an application or class of applications is not 'reasonable network management' under the FCC Policy Statement,"[57] that "intentionally degrading applications without informing Internet users

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http://www.screenplaysmag.com/Editor/Article/tabid/96/articleType/ArticleView/articleId/678/Default.aspx.

54 *See, id.* for Mr. Lafferty's statement that "We agree with the FCC report two weeks ago, which was cautionary to lawmakers on introducing new regulation that might stifle this kind of innovation and discourage investment."

55 *Free Press Petition* at 9.

56 *Vuze Petition* at 9.

57 *Free Press Petition* at iii.

constitutes a deceptive practice"[58] and that injunctive relief and forfeitures are the proper remedies for any violation.[59] Vuze asks the Commission to adopt new network management practices "based on the actual impact on the network, rather than targeting or disproportionately impacting specific services or technologies."[60] The *Vuze Petition* also asks the Commission to adopt rules requiring network providers to disclose and make transparent its network management practices.[61]

The crux of the issue raised in these petitions that the Commission must address first is whether there is sufficient evidence of exclusionary practices by network providers in employing network management policies. In its comments in the *Wireline Broadband Practices NOI*, the FTTH Council submitted that the Commission in answering this question should use the factors enunciated by the Section of Antitrust Law of the American Bar Association in its comments filed before the Federal Trade Commission in March 2007 regarding potential regulatory intervention in the operation of the Internet. The FTTH Council continues to believe this is the correct approach. Accordingly, in evaluating the need for relief, the Commission should inquire into:

(1) whether the market is susceptible to a durable exercise of market power...;

(2) the extent to which new or competing technologies are likely to evolve, to be viable and to substitute or displace existing ones;

(3) whether pricing and quality of service indicate that the market is behaving well or poorly; and

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58 *Id.* at i.

59 *Id.* at 32, 33.

60 *Vuze Petition* at 15.

61 *Id.*

(4) the extent of documented harms to consumers.[62]

A. Defining the Product and Geographic Markets

1. What is the relevant product market?

The threshold issue in inquiring into exclusionary conduct is to define the relevant product and geographic markets. If anticompetitive behavior is occurring, it must be discernible within those markets, and any regulatory intervention that might be considered must be tailored to address the exercise of the market power so as to improve societal welfare and to prevent adversely affecting the operation of otherwise healthy behavior, including that in adjacent or related markets.

For purposes of the Commission's inquiry into the *Free Press Petition* and *Vuze Petition,* the particular product market in question is characterized by the transmission of content and applications via the Internet between providers and end-users, in particular over the "last mile." It is within this sphere that network providers allegedly have the power to act to distort the healthy competition among content and application providers, picking winners and losers, rather than allowing end-users, in the aggregate, to make that choice, as would occur in a properly functioning marketplace. Petitioners express the concern that network providers may engage in practices that harm the products of unaffiliated content or application providers by degrading or blocking the traffic.

The first question is whether all content and applications are similarly susceptible to such an exercise of market power, even in theory? The FTTH Council submits that the answer is no and that the Commission should focus only on a narrow subset of applications for present

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62 Comments of the Section of Antitrust Law of the American Bar Association In Response to the Federal Trade Commission's Request for Public Comment Regarding Broadband Connectivity Competition Policy, March 2007.

purposes. As explained above, content and applications and Internet subscribers have coevolved with the Internet itself. Many applications continue to lack the need for immediate transmission and interactivity.

The FTTH Council submits that the Commission should focus its product inquiry on practices surrounding applications that involve interactivity and corresponding demands by end-users that there be "no noticeable delay."[63] Transmission of these types of applications should be the product market segment to which the test outlined above should be applied by the Commission as a litmus test. Principal examples that might merit inclusion, depending on the state of specific technology, would be VoIP applications and certain applications involving video-streaming where "real time" interactivity with other persons is paramount, such as on-line gaming, telesurgery, and distance learning. These applications are the ones most susceptible to discrimination by network providers that would unreasonably favor one over the other and therefore define the relevant product market within which to look for anticompetitive activity. In contrast, a delay in the acquisition or seeding of large video files, which occurs in many P2P applications, does not carry as much import and is less noticeable by users – assuming the delay is not for an unduly long period.

To lessen any possible harm to "no noticeable delay" applications, broadband users can choose to access higher bandwidth services. Almost all network providers offer their customers a choice of several tiers of service characterized principally by different speeds of connectivity. The choice among which tier is selected is made largely on the manner in which the user (or group of users in a household or small business) will make demands on the Internet.

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63 "No noticeable delay" more accurately describes the character of the applications at issue rather than the more common term "real-time." In the digital world of packet networks, unlike the analog world, buffering always occurs, so no traffic is truly "real-time."

Where desired applications involve considerable degrees of interactivity requiring no noticeable delay, the household or office is likely to opt for a faster connection. (Such Internet users are also likely to purchase computer models with faster processors, greater RAM, and state-of-the-art video cards and make upgrades more frequently to maximize their experience and take better advantage of interactive applications, and the software that supports them, as they develop.) Indeed many households or businesses may obtain a broadband connection even where the majority or virtually all of their use of the Internet involves content or applications where "no noticeable delay" is not a prerequisite.

2. What is the relevant geographic market?

Turning to the geographic market, the question for the Commission, at bottom, is whether to treat the market for transmission between content and applications providers and end-users as local or national.[64] The product market as described above operates in a "vertically dependent" environment where it is, in effect, provisioned both by the market participants from above (the content and application providers) and below (the network providers' end-users).[65] It would be faulty in many ways to view the geographic market as solely limited to the area covered by a local network provider, although it would certainly be preferable to have, in any

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[64] Although the Internet is international, the FCC's reach does not extend beyond the borders of the US.

[65] Participants in the Internet are highly interdependent. Local network providers cannot sell broadband access if upstream providers are not viable, producing attractive content and applications requiring broadband capabilities. These same providers and end-users need platform providers to invest in deploying more robust transmission facilities with higher throughput rates. Thus, an action by a single participant generates reactions – and counter tactics – from others. As a result, it will be very difficult for any single entity or group of entities to engage in anticompetitive practices. As a consequence of this interdependence, as explained elsewhere in these comments, upstream providers and end-users have a growing number of tools to counter any effort by network platform providers to squeeze them improperly.

given geographic area, a plethora of local network providers with very large – FTTH-like – transmission facilities. The Internet indubitably has national reach. For many content and application providers, they view their customer base as nationwide. Where content and application providers perceive an effort by a local network provider to discriminate in the product market making it relatively difficult or more costly for them to reach the network provider's customer base, the content and application providers have abilities to exert pressure or implement countermeasures against the network provider.

Because content and applications providers have a national, if not international, reach, a local network provider without effective competition for local broadband customers would be limited in its ability to capture any additional rents if it attempted to transfer its power into the upstream market. The local network provider – even where it, in actuality, is the local network provider to end-users in numerous municipalities covering tens of states – simply would not have the ability to force the application or content provider's hand. As basic options available to end-users for access to the Internet become increasingly widespread, a local network provider attempting to engage in exclusionary practices could be foreclosed by other local network providers in its same operating area or providers in adjacent geographic areas who would perceive the ability to expand and provide access to the content or application provider(s) against whom the one network provider is discriminating. Thus, the geographic market for the transmission product at issue has non-local, even national, characteristics as well.

In examining the question about whether network providers have substantial and durable market power in the relevant market, the Commission should focus on the overall "balance of power" among the many participants in the generation, delivery, and receipt of information via the Internet. In doing so, it will find that power and the potential for power is

distributed throughout the entire product stream. For example, while there may be only two local wireline providers of broadband access service in most markets, they (or ISPs using their networks) may still have to pay certain content sites, such as ESPN360, to allow their Internet access customers to receive the content. Moreover, leverage does not necessarily lie only with larger content and applications providers. There are ways for smaller producers to gain leverage by sharing resources and aggregating their products.

B. Congestion Is Inherent in Network Operation, Including the Internet

As another threshold matter, the Commission and other policymakers must keep in mind that the Internet is a "best efforts" network, as described above. It is neither centrally designed nor implemented, which is both its strength and its potential weakness. The signal characteristic of its strength is its adaptability and malleability. In term of its weaknesses, the Internet is subject to congestion. As use of the Internet continues to grow, and the demands by users and the offerings of content and application providers continue to evolve in the direction of more broadband applications involving video, voice, larger and larger files, and general interactivity, the potential for congestion is ever present.

All providers face choices about how to manage the risk for congestion. Among myriad other details, network providers must consider how many routers to place and where, how much buffer memory is required, transmission capacities for shared transport, and what tiers of access speeds its customers will want and in what proportions. Network architecture decisions made by local network providers in one area may or may not be replicated or complemented by transmission/back haul providers upstream, which confront, on a different scale, many of the same issues. Content and application providers must make numerous decisions that are, in several respects, reactionary to those made by network providers. Given the present architecture of the Internet, capabilities enjoyed by target end-users (on the whole),

and the data management techniques currently available, there are a multitude of basic variables to consider, including how large should web pages be, what are the set up requirements for a web page, how much animation should be included, and how large should video windows be before quality degrades.

Indeed, the history of the Internet, given its decentralized, "best efforts" nature, can be characterized by the attempts that have been made to minimize the potential for congestion while maximizing the number of users and the intensity of their use. Because of the major threat that congestion presents with an interdependent system where "no one is in charge," there is an expectation among industry participants that you pay or expend resources in one way or another to deal with congestion (or for that matter, other objectives such as enhanced security) to your satisfaction. In short, the ever present possibility of dropped packets and delays motivates the players both upstream and downstream. This leads all participants to develop differentiated "congestion reducing" practices that change frequently and that should only be determined to be unreasonable when specific facts are presented that such activities are exclusionary.

C. Network Management Policies Are Healthy and Should be Encouraged

Managing congestion is a necessity, and it comes in many forms. End-users have a variety of access choices, many times from one provider. In addition to the choice between dial-up and broadband, end-users are typically offered selections of different broadband speeds. As a result, end-users can determine what speeds they want to pay for which will reflect the applications they intend to use and the experience they intend to have.

The availability of different tiers of service at different prices is reasonable differentiation characterized by different speeds of access, and it has not been seriously suggested otherwise. In addition, efforts by network providers to identify and block denial of

service attacks to viruses, worms, spyware, phishing and other forms of malware is no doubt expected by end-users. Finally, some types of prioritization of transmissions from content and applications providers are reasonable, such as giving VoIP transmissions superior routing or affording packets associated with emergency communications more expeditious treatment than non-emergency communications. In order to maximize the end-user experience, advantaging categories of applications where "no noticeable delay" is not tolerated, simply makes good business sense from a service standpoint, is expected by end users, and is reasonable.

To the extent there is some potential, albeit to date hypothetical, concern it would be with network providers who could seek to advantage through network management practices one or more affiliated content and application providers. The motivation behind such favoritism would be that a network provider could somehow use these practices to advantage its affiliate so as to adversely affect its rivals or discriminate against its affiliate's competitors so as to favor its affiliate.

There are a number of reasons why this result is not likely and preemptive regulation, with the attendant costs it is sure to impose on industry participants, would not be wise. First, because the market for such content and applications provider affiliates and their rivals is national (if not international) in scope, the actions taken by a single local network provider are unlikely to result in monopoly rents.

Second, the Internet is a highly dynamic system. Any effort to pick winners and losers is a very speculative proposition. The choice to tie one's local network access product into the discriminatory promotion of affiliated content and application providers creates the risk – because of the inability to extract monopoly rents as noted above and because of the plethora of actual and potential countermeasures described below – that not only will anticompetitive

conduct fail to produce its desired effect but that the discriminator's network access product will suffer as well in the perceptions of end users.

Third, there are myriad ways that content and application providers as well as end-users can prevent unreasonable network management practices from happening. The current generations of Content Distribution Networks and P2P networks and VPNs are in a very real sense "arms suppliers" for producers and consumers, helping ensure a balance of power. P2P providers, in particular, have become a major force as they continue to evolve their technologies to permit users to distribute information from numerous edge computers more securely. These overlay providers are evolving so rapidly and are so responsive to the needs to providers and users that network platform providers have a difficult time keeping pace with them. In other words, any effort to exercise market power would be unlikely and, at best, be ephemeral.

D. The Case for Regulation Has Not Been Made

Turning back to the four-part test set forth earlier in this Section, the FTTH Council submits that a justification for the imposition of regulations to govern the network management practices is not present.[66]

1. The market is not susceptible to a durable exercise of market power.

As explained above, because of the congestion generated by P2P traffic and because of the need to ensure that end users have a satisfactory experience in accessing more time-sensitive ("no noticeable delay") traffic, local network providers need to engage in a wide variety of ever changing network management practices, which is consistent with a healthy marketplace at work. While there is a potential, albeit slim, for exclusionary acts, there are

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[66] As stated earlier, the Council does not believe the P2P applications referenced in the petitions fit in the "no noticeable delay" category, and thus of heightened concern to the Commission.

forces in place as a result of the interdependence of the vertical chain of suppliers within the Internet that make such anticompetitive behavior unlikely. Moreover, end-users and content and application providers have a variety of effective countermeasures at hand that would check the ability of a local network provider to sustain an "effective" campaign to engage in anticompetitive behavior through unreasonable network management practices. In sum, there is no indication that network providers have obtained a sufficient degree of durable market power.

2. New or competing technologies are likely to evolve, to be viable and to substitute or displace existing ones.

As has been stated in these comments, the Internet undergoes constant evolution as end-users, content and application providers, and network providers seek ways to overcome problems of congestion and other technical limitations of the "best efforts" Internet. This is particularly the case with swiftly evolving P2P technologies. This "technology evolution" in turn continuously alters the balance among the market participants and levels the playing field. Further, it spawns additional means of end-user access to content and application providers, effectively dissipating any power network platform providers might possess.

When it comes to such a dynamic and diverse environment as the Internet, the Commission should be very wary of translating individual and isolated acts into industry trends that warrant a regulatory response. The unpredictable nature of what will happen next on the Internet demonstrates that it is the very model of a robust market at work. This holds not only for content and applications but access as well. Only a decade ago, users relied on dial-up access. Then, cable modem access took off, and DSL access fought to catch-up. Today, wireless access is accelerating, telephone providers are deploying FTTH and other fiber-rich networks, and cable providers are rolling out DOCSIS 3.0.

3. There is no evidence that prices are increasing or that quality of service is decreasing.

There is absolutely no indication that network providers engage in traffic management practices for nefarious purposes but rather to ensure end users have a satisfactory experience.[67] The Commission has received no evidence of complaints involving "no noticeable delay" services, many of which compete with services provided directly by network providers. Rather, the petitioners claims are only directed at traffic management addressing P2P activities sharing large video files, which are not so time-sensitive and which, in certain circumstances, may effect the experiences of other users. In addition, no evidence has been presented that these alleged degradation problems are either ubiquitous among network providers or are more than isolated events. While unreasonable degradation is a problem that the Commission should address, it should do so only based on the type of sufficiently detailed, specific factual showing that occurs in an complaint proceeding.

4. There are no allegations of harms by network providers as whole and insufficient documentation of alleged harms by individual providers such that generic network management regulation is warranted or regulation requiring enhanced disclosure of network management practices to customers.

Section 3 above addressed the question of whether petitioners have presented documented harms to consumers of access to P2P services and found the petitioners have failed to provide sufficient evidence to support any industry-wide actions by the Commission. The petitioners also allege that network providers are in effect engaging in deceptive practices because they are not properly disclosing to end users their network management practices. As a threshold matter, there are several elements essential to proving that deceptive practices have

[67] The pricing practices of network providers indicate that end users can choose the experience they want by selecting among different levels of service.

occurred. First, the practice must be likely to mislead the consumer. Second, the consumer must have acted reasonably in interpreting the practice. Third, the practice must be material.[68]

Once again, the petitioners have not provided the type of specific evidence required to clear these three hurdles, particularly in regard to network providers as a whole. All of the network providers have disclosed the terms and conditions of their access policies to their customers. If customers believe any such policies of a provider are deceptive, the proper forum to handle them is by filing a complaint. The Commission should only consider the adoption of rules if there is evidence of industry-wide abuses, which the petitioners have failed to show.

Further, should the Commission ever deem it essential to adopt disclosure regulations, it must not compromise network security by either requiring network providers to disclose the precise techniques employed to manage traffic or to disclose immediately the exercise of any management activities, which could enable someone to reverse-engineer and determine the management practice used. Again, it is far more preferable for the Commission to encourage industry-led cooperative solutions where confidentiality agreements can govern and network security can be ensured and enhanced.

## IV. COSTS OF NETWORK MANAGEMENT REGULATIONS ARE DISPROPORTIONATELY LARGE

The regulatory constructs proposed by petitioners are based on the premise that such requirements will effectively address problems caused by unreasonable network management practices by all network providers while placing minimal burdens on network providers. As discussed in the previous section, the need for regulation has not been demonstrated because of the lack of evidence of real-world problems. Assuming *arguendo* that

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[68] *See*, FTC Policy Statement on Deception, Appended to Cliffdale Associates, Inc., 103 F.T.C. 110, 174 (1984). (http//:www.ftc.gov/bcp/policystmt/ad-decept.htm)

the need for regulations is demonstrated, the Council submits that the burdens will far exceed any benefits. For a great many reasons, the proposed network management regulations would be of dubious effectiveness and commercial value while imposing tangible and significant costs on network platform providers and the overall market. In the end, the Council greatly fears that requirements as proposed by the petitioners will produce perhaps the worst of all possible combinations – unnecessary and correspondingly ineffective yet overly burdensome and counterproductive regulation.[69]

A. Effective and Equitable Network Management Regulations to Is an Oxymoron

The proponents of a non-discrimination requirement give scant consideration to the threshold issue of whether the Commission can adopt effective and equitable regulations to address potential problems with network management practices by network platform providers. They merely take it as a given the Commission can construct a regulatory regime that is sufficiently responsive to commercial realities, permits an in-depth expert examination and analyses of the evidence, and gives all parties due process. After years of experience with complaint proceedings, interconnection and intercarrier compensation disputes, and such matters as cable rate regulation, there is nothing to indicate that this assumption has any validity. In fact, the contrary is much more likely to be the case.

There are many reasons why regulatory action will be of dubious value. First, as even the proponents of regulation admit, the Commission will have great difficulty distinguishing between reasonable and unreasonable network management practices. There simply is no easy guide to show when permissible congestion management crosses the line to

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[69] Further, a requirement that has no "teeth" would tend to lessen vigilance and eliminate the threat of real regulation. The better course is to refrain from adopting rules while retaining oversight and the potential for future regulation if ever needed. *See Felten Paper at 10.*

impermissible exclusionary conduct. Second, as demonstrated by decades of experience with the Commission's enforcement (complaint) process, it cannot reach a decision effectively and equitably without a highly detailed examination and analyses of the prices, terms, and conditions for interconnection and access. Each of these elements can be material, and they are interrelated.[70] But, in addition, in regard to network management practices, the Commission has absolutely no base of knowledge upon which to assess these complaints and then to fashion generic regulatory responses. Unlike traditional retail telephone regulation – or even the wholesale regulation which has developed since the Telecommunications Act of 1996 – there is no record of reasonable or unreasonable practices for the Commission to use in judging broadband access complaints.

In light of all of these known drawbacks to effective regulation regarding network management practices, it is somewhat surprising that the proponents place such great reliance on their efficacy. It is much more preferable to encourage cooperative, industry-driven solutions.

B. The Harms from Regulation Would Be Substantial

Network management regulation as described by the petitioners would create substantial costs, either directly by prohibiting normal commercial practices or making such activity more expensive, or indirectly by creating greater uncertainty. More specifically:

1. Network providers would be reluctant to adopt practices that would reduce congestion.

2. Network providers would have a decreased incentive to invest.

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[70] See *Network Neutrality and the Economics of Congestion* at 1896: "In short, when the interface is complex, network neutrality poses regulatory authorities with the nearly insuperable task of regulating almost all aspects of the business relationship."

3. Network providers may be discouraged from adopting necessary security measures. As noted by Professor John Peha, Associate Director of the Center for Wireless and Broadband Networking, "Perhaps the greatest danger from an overly broad network neutrality proposal is that it could undermine security."[71] While pro-regulatory advocates claim that it would be possible to carve out actions based on network security needs, it is often difficult to discern when a packet in a service or application poses a threat. It is very much a judgment call by the network provider. Yet, unless the ability of the provider to make that call is preserved, there is a much greater chance a security breach can bring down the network or harm users.

The costs of regulation do not stop here. Once regulations are adopted, they are not easily changed to reflect current circumstances. Consequently, unintended consequences are sure to increase. This problem, of course, is greatly magnified in the Internet's "high-speed" environment. While generations of technology would quickly come and go, regulations would be standing still. This would inhibit providers at all levels from responding rapidly to consumer needs and extracting the full potential value from the Internet.

The imposition of a costly regulatory regime can only be justified if there is widespread abuse of market power that is substantial, sustainable, and clearly identified. However, where – as with today's Internet – such problems cannot be found, where the market is so dynamic, and where there is a balance of power among providers and users, these costs are far too much to bear.

## V. CONCLUSION

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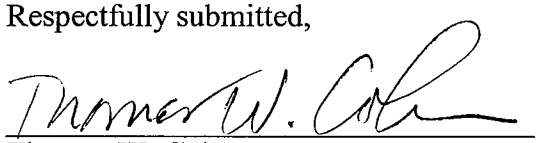
[71] *The Benefits and Risks of Mandating Network Neutrality* at 18.

In its *Wireline Broadband Policy*, the Commission rightfully noted that all of its principles are subject to reasonable network management practices. Efforts by network providers to address congestion and provide a satisfactory experience for users are highly complicated and very much network and traffic specific. The allegations in the *Free Press Petition* and the *Vuze Petition* only are levied against a single network provider – and even here they lack the specificity required for a complaint proceeding – and, because they are no charges of industry-wide problems, they are insufficient to sustain a declaratory ruling or adoption of new rules. The FTTH Council urges the Commission to reject the petitioners request for such relief.

Respectfully submitted,



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